Space Weather Forecast

Issued on Thursday, 18 April 2024 at 13:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-flares likely and a slight chance of Strong-flares. Slight chance of G1/Minor Storm conditions day 3 (20 Apr) due to a fast wind from a coronal hole.

Solar Activity: Activity is currently Moderate. The largest flare was a Moderate flare at 18/0248 UTC from a small region amongst a cluster of sunspot groups in the southeast disc. There are fourteen sunspot regions currently visible on the disc. The largest and most magnetically complex region lies within the cluster of sunspots located in the southeast of the disc. The next largest region is located in the northeast, although sizeable, maintains a more magnetically simple appearance. The complex multi spot region in the southeast contains several groups with enhanced magnetic complexity. Remaining regions appear generally stable with only slow evolution.

A filament eruption (arc of the Sun's plasma) was observed around 17/0200 UTC lifting off in the northern hemisphere, although unlikely to have any Earth-directed component as the bulk of material appears to be heading north away from the Earth-Sun line. Meanwhile, further CMEs were observed from an area near a sunspot region located in the southeast of the disc. These may have a minor Earth-directed component(s), which have been analysed and would only be expected to be observed as weak transients during the 21 or 22 Apr. Low confidence.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of minor CME influence during the period. Solar winds were largely background, but with a peak of 412km/s (slightly elevated) observed at 18/0228 UTC. The Interplanetary magnetic field (IMF) strength was weak initially moderate following the arrival of the CME, reducing to weak after its passage. The important north-south component was weakly to moderately southwards directed between 17/0900-1800 UTC, then largely weakly northward directed thereafter. Resultant geomagnetic activity was mostly Quiet (Kp0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast with occasional Moderate-class flares likely and a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A CME that left the Sun on 15 Apr was expected to give a glancing impact at Earth early on Day 1 (18 Apr) and is now overdue, although this feature was low confidence. A second CME that occurred late on 16 Apr has been analysed as a likely miss below Earth' orbit on day 4 (21 Apr). Further CMEs associated with streams of plasma originating from a relatively small sunspot region in the southeast may give some weak transient features towards the end of the forecast period, although confidence is low. Solar winds are currently at normal background speeds. A recurrent coronal hole high-speed stream is expected

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to become geo-effective on day 3 (20 Apr) likely increasing speeds to slightly elevated or elevated levels, continuing into day 4 (21 Apr), before gradually waning.

Geomagnetic activity is expected to be at mostly Quiet to Unsettled, with a slight chance of Active or G1/Minor Storm on day 1 (18 Apr) if any glancing CME arrives at Earth. Low confidence. Increasing to Unsettled to G1/Minor Storm levels during day 3 (20 Apr) due to the arrival of a HSS from CH25/-. On day 4 (21 Apr) activity is forecast to become Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no Solar Radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	20	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	10	10	10	10

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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